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• **Wirkus, Michelle Ann**  
**Brookfield, Queensland 4069 (AU)**

(72) Inventor: **Wirkus, Randolph Andrew**  
**Brookfield, Queensland, 4069 (AU)**

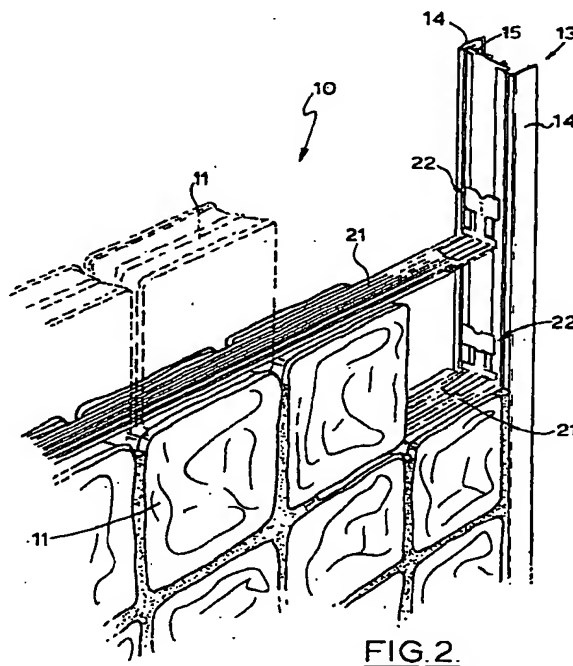
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(74) Representative:  
**Jones, Graham Henry**  
**Graham Jones & Company**  
**77 Beaconsfield Road**  
**Blackheath, London SE3 7LG (GB)**

(71) Applicants:  
• **Wirkus, Randolph, Andrew**  
**Brookfield, Queensland 4069 (AU)**

(54) **A glass brick assembly**

(57) A method of forming a glass brick assembly (10) from a plurality of glass bricks (11), said method including the steps of providing upstanding end frame members (13) for defining the boundaries of said assembly (10), providing separation strips (21) for location between adjacent courses of bricks (11), providing connectors at each end of said separation strips for connecting said separation strips (21) to said end frame members (13), and the end frame members (13) having locators locating each said connector with its adjacent end frame member.



**FIG. 2.**

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## Description

**[0001]** THIS INVENTION relates to glass brick assemblies including walls, windows and screens and in particular to a support bracket assembly and associated components for use in the construction of glass brick walls.

## BACKGROUND OF THE INVENTION

**[0002]** Glass bricks are generally of rectangular or square shape and formed from two hollow halved joined together by welding which results in a central weld bead between side edges of the bricks and forms a channel around the periphery of the bricks. Many different arrangements are provided for forming the bricks into a stable wall. In one such arrangement horizontal separation strips are provided between respective courses of bricks and adhered to the bricks and the ends of the separation strips are secured at each end by suitable brackets to a frame or wall or alternatively retained. In some arrangements, a purpose designed support frame is provided with which a plurality of glass bricks may be assembled to form a brick wall. Such arrangements are not adapted for connection to other structures and are limited in their application.

## OUTLINE OF THE INVENTION

**[0003]** It is an object of the present invention to provide an improved method of and means for forming a glass block wall. It is another preferred object of the invention to provide an improved support frame assembly for a glass block wall which include a number of optional components which can be selected for construction of a wall to suit different applications.

**[0004]** In one aspect therefore, the present invention resides in a method of forming a glass brick assembly from a plurality of glass bricks, said method including the steps of providing upstanding end frame members for defining the boundaries of said assembly, providing separation strips for location between adjacent courses of bricks, providing connectors, typically brackets at each end of said separation strips for connecting said separation strips to said end frame members, and locating each said brackets with its adjacent end frame member. Preferably the connectors frictionally engage locators on said frame members.

**[0005]** In a further aspect, the present invention provides a glass brick assembly formed from a plurality of glass bricks arranged in respective horizontal courses, end frame members for defining the boundaries of said assembly, separation strips located between adjacent courses of bricks, connectors, typically brackets at each end of said separation strips connecting said separation strips to said end frame members, said end frame members has locators, said brackets preferably being frictionally engaged with the locator of its adja-

cent end frame member.

**[0006]** The end frame members suitably comprise one or more rails and may include a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel with which the brackets may cooperate. The brackets suitably includes opposite tongues which may locate within the C-shaped channels behind the opposite flanges with the remainder of the brackets on the outside of the flanges whereby the flanges are frictionally engaged to be retained to the end frame members.

**[0007]** For engagement of the brackets with the respective end frame members, the brackets may be suitably oriented to allow the opposite tongues thereof to enter the C-shaped channels whereafter the brackets may be rotated to locate the tongues rearwardly of the channel flanges.

**[0008]** For erection of a glass brick wall with separation strips between the respective courses of bricks, opposite brackets are assembled with a separation strip which is provided or cut to a length to extend between opposite end frame members. The assembly of separation strip and brackets at each end may then be oriented as a whole to allow the respective pairs of tongues of the respective brackets to enter each channel after which the assembly is rotated to locate the tongues rearwardly of the channel flanges whereby the brackets are in frictional engagement therewithin. The end brackets may then be moved downwardly for example with the aid of an impact tool to position the separation strip adjacent and engaged with the adjacent course of bricks.

**[0009]** In an alternative arrangement, the brackets may be moved into engagement endwise with the C-shaped channels with the tongues of the brackets located rearwardly of the opposite flanges of the channels. The brackets may be moved longitudinally along the channels to the required position.

**[0010]** The end brackets means may be engaged with the separation strip by any suitable arrangement. In one arrangement, the brackets may include a plurality of fingers which locate on opposite sides of, that is above and below, and in channels in the separation strip. In a further form, the fingers of the brackets may extend into respective channels on one side of the separation strip which captures the fingers allowing limited longitudinal movement of the brackets relative to the separation strip but constraining the brackets against lateral movement.

**[0011]** The end brackets may also have means which allow them to be secured to other forms of end frame members by conventional fasteners. For example, the end brackets may be apertured to receive a nail, screw or rivet whereby the brackets may be secured to timber or metal frames. Centering or locating means such as in the form of a V-groove may be provided in the brackets for alignment purposes for example with a string or chalk line.

**[0012]** Suitably the brackets are formed of sheet

metal however they may be formed of other materials such as plastics.

[0013] The end frame members may be of any cross sectional form but suitably are U or channel shaped form in cross section and include a pair of side flanges and being open on their outer side, that is the side opposite the glass bricks. The inner side of the frame members may also incorporate a longitudinally extending groove or grooves for accepting a sealant for example an applied silicon sealant for sealing the bricks to the end frame members.

[0014] The opposite side of the planar face of the frame member may be provided with one or more screw flute extrusions to enable frame members to be assembled at a corner at right angles to each other to form a mitre joint. Alternatively, the frame members at a corner may be connected by suitable brackets for example internal right angled brackets.

[0015] The open channel section of the end frame members may be connected to further joining members or closure members. For this purpose, the side flanges of the end frame members suitably terminate at their free ends and on their inner sides with a pair of connecting beads enable connection of a range of add-on sections. Suitably the connecting beads are of headed form to provide for a snap connection.

[0016] In one form, the add-on section may comprise a rail including substantially planar cover plate having hooks at each end for engagement with the respective beads to close the open frame member and form a neat outer planar end surface at say the end of a wall. Where similar frame members are also provided at the top of a wall, those frame members may be similarly closed by a planar cover plate. The cover plate may provide a mounting for connection of other structures to the glass brick wall. Typically, the planar cover plate may provide a mount for connection of a conventional shower screen which extends from the glass brick wall.

[0017] In a second form, an add-on section may comprise a joiner which permits a pair of end frame members to be joined at for example at 135° to each other. This section may comprise a pair of flanges arranged at 135° to each other having hooks at each end for engagement with the outer connection beads of respective end frame members and a spanning flange extending between the junction of the pair of end flanges and having at its free end opposite hooks for engagement with the inner connection beads of respective end frame members.

[0018] In a further arrangement for joining end frame members at right angles, the respective flanges of the joiner are arranged at right angles to each other. As an alternative to joining pairs of end frame members, the joiner sections may be terminated with planar cover plates as referred to above to present a planar end surface to the glass brick wall.

[0019] For coupling say to a proprietary shower screen, one add-on section may be in the form of a

cover plate with a pair of parallel outwardly extending flanges spaced to mate with the known shower screen assembly. Such a cover plate may be used at the end of the glass brick wall to close the end frame member or alternatively provided for engagement with a joiner section so as to be oriented at a desired angle relative to the glass brick wall for example at 135° or 90°.

[0020] For use as a fixed window panel, an add-on section which includes a nailing fin may be provided enabling the end frames to be secured to a supporting frame such as a timber frame by nailing or alternative fastener through the nailing fin.

[0021] The nailing fin section may comprise a substantially planar nailing fin which is beaded at one end for clip or snap engagement in a longitudinally extending groove within the end frame member suitably provided on the rear side of the planar face. A right angled flange may extend from the nailing fin, the flange terminating in a hook for clip or snap engagement with a bead on the side flange of the end frame member.

[0022] Where the glass brick wall is to be used as an external fixed window in a brick veneer wall construction, the nailing flange section may be used to secure the wall to a timber wall stud. A further cavity closing section may be engaged with the opposite side flange of the frame member and the connection bead thereon to extend to and over the brickwork to close the cavity between the stud and bricks.

### BRIEF DESCRIPTION OF THE DRAWING

[0023] In order that the invention may be more readily understood and put into practical effect, reference will be made to the accompanying drawings which illustrate a preferred embodiment of the present invention and wherein:

Figure 1 illustrates a glass brick wall formed in accordance with the present invention;

Figure 2 illustrates the manner in which the glass brick wall is formed;

Figure 3 illustrates an end bracket for use in forming the glass brick wall and a typical end frame member;

Figure 4 illustrates the manner in which the end brackets are engaged with the end frame member;

Figure 5 illustrates an end bracket engaged with an end frame member;

Figure 6 is a sectional view along line A-A of Figure 5 showing the engagement of the end bracket with the end frame member;

Figure 7 illustrates in side view, the engagement of the end bracket with the end frame member;

Figures 8 and 9 illustrates in rear perspective and rear view an alternative end bracket;

Figure 10 illustrates the manner in which the bracket of Figures 8 and 9 is engaged with the end frame member;

Figure 11 and 12 illustrates an alternative end bracket and separation strip for use with the end bracket of Figure 11; and

Figures 13 to 17 illustrate add-on sections for use with the end frame member.

#### DETAILED DESCRIPTION OF THE INVENTION

[0024] Referring to the drawings and firstly to Figure 1 there is illustrated a glass brick wall 10 formed of a plurality of glass bricks 11 which are laid in respective horizontal courses or rows and surrounded by a support frame 12 including in this embodiment a pair of end frame members 13 and top frame member 13'. As shown more clearly in Figures 2 and 3, the end frame members 13 are of generally C-or channel sectioned form with the open side facing outwardly and include a pair of opposite side flanges 14. The inner side of the end frame members 13 includes a planar transverse web 15 between the side flanges 14 and a pair of inwardly directed flanges 16 which are spaced from the web 15 and which form with the web 15 a shallow C-shaped channel comprising longitudinally extending opposite slots 17. Extending longitudinally of each member 13 and on opposite sides thereof are a pair of sealant grooves 18.

[0025] The opposite or inner side of the planar web 15 includes spaced longitudinally extending screw extrusion flutes 19 to permit a pair of members 13, for example an end member 13 and a top member 13' (see Figure 1) to be arranged at right angles to each other to form a mitre joint and be screw joined by screws extending from say the top member 13' into the screw flutes 19 in the end member 13. By this arrangement a rectangular frame can be constructed to surround glass bricks 11. The planar web 15 also includes on the same side a further longitudinally extending groove 20, the purpose of which will become apparent below. Suitably, the end frame members 13 (and top member 13') are manufactured as an extrusion from for example aluminium.

[0026] Extending between respective rows or courses of bricks 11 are elongated separation strips 21 which locate in the channels formed in periphery of the bricks 11 and may be secured in position by means of a suitable adhesive or bonding agent. The strips 21 are connected at each end to the end frame members 13 by respective pairs of brackets 22 (see Figure 3) at each end. The brackets 22 are of substantially right-angled form and have in this configuration forwardly projecting substantially horizontal fingers 23 and 24 which are adapted to locate in grooves in the strips 21. Suitably the pair of outer fingers 23 are offset from the central finger 24 so that the fingers 23 and 24 locate in grooves 25 and 26 respectively on opposite sides of the strip 21. The upright portion 27 of the brackets 22 includes a pair of opposite outwardly directed tongues 28 which are offset rearwardly relative to the remainder of the upright portion 27 which includes an upper planar section 29

provided with a central V-groove 30 for alignment purposes and securing apertures 31 and a lower planar section 32 in substantially the same plane as the upper section 29. The sections 29 and 32 are joined through an integrally formed central web 33 to which the tongues 28 are joined. The ends of the tongues 28 are of curved form as at 34 and the diagonal distance D between the junction of the respective tongues 28 with the central web 33 is less than the distance between the inner peripheral ends of the flanges 16 (the dimension "d" in Figure 3).

[0027] Suitably the brackets 22 are formed of sheet metal so as to be of a relatively thin construction.

[0028] For assembling a glass brick wall 10, a first course or row of bricks is laid between upright end members 13. A separation strip 21 is cut to substantially the same or slightly smaller distance than the distance between the inner sides of the members 13 and assembled with brackets 22 at each end, the fingers 23 and 24 of respective brackets being located above and below the strip 21 at the end thereof.

[0029] The assembly of strip 21 and brackets 22 is then oriented in the manner shown in Fig 4, that is with the portion 27 of the brackets 22 extending substantially at right angles to the member 13 with the tongues 28 being located adjacent the planar web 15. Both brackets 22 are then simultaneously rotated in the direction indicated by the arrows to move the tongues 28 into the slots 17 with the flanges 16 sandwiched between the tongues 28 and sections 29 and 32 of the bracket as shown in Figures 5 and 6. Rotation of the brackets 22 is allowed because of the distance D is less than the distance d (see Figure 30 and is further facilitated by the curved ends 34 of the tongues 28. The offset of the tongues 28 relative to the sections 29 and 32 is such that the flanges 16 are frictionally engaged by the tongues 28 on one (the inner) side and the sections 29 and 32 on the outer (the outer) side. For final positioning, impact tools or simply hand pressure may be used to move the brackets 22 downwardly longitudinally along the end members 13 which remain captured thereto until the separation strip 21 is located in the channels in the periphery of the bricks 11 as shown in Figure 7. Of course a suitable adhesive is applied to the strip 21 to secure it to the bricks 11. This procedure is then repeated for successive courses or rows of bricks 11 until the wall 10 is constructed.

[0030] In an alternative assembly method, the brackets 22 may be moved from one end into engagement with the members 13 with the tongues 28 positioned in the slots 17. The brackets 22 captured in this fashion may then be forced along the members 13 to a desired position as before by use of suitable tools or hand pressure. Usually the separation strips 21 are required to be assembled with the brackets 22 before engagement of the brackets 22 with the members 13 however in some cases the strips 21 may be joined to the brackets 22 after their engagement with the mem-

bers 13.

[0031] Figures 8 to 10 illustrate an alternative bracket 35 for assembly with an end member 13. The bracket 35 is similar to the bracket 22 of Figure 3 and like components have been given like numerals. The tongues 28' in this embodiment have a reduced necked portion 36 which joins them to the central web 33' remainder of the bracket 33. Again the diagonal dimension "D" between the junctions between the respective necked portions 36 and web 33' is less than the distance "d" between flanges 16 to permit rotation of the bracket 35 into locking engagement with the member 13 in a similar manner to that described above and with reference to Figures 3 to 6.

[0032] Figures 11 and 12 illustrate a further embodiment of the invention wherein the separation strip 37 in this case is provided on its underside with a pair of channels 38 and the end bracket 39, of similar form to the bracket 22, includes a pair of fingers 40 which are spaced apart substantially the same distance as the channels 38 so as to be slidably receivable within the channels 38. The bracket 39 and separation strip 37 in this embodiment is designed for narrower glass bricks but is again used in the same manner as described above and with reference to Figures 3 to 6.

[0033] The end members 13 are so formed as to adapt the glass brick wall 10 for a number of different applications. For this purpose, the free ends of the side flanges 14 are provided with inwardly directed longitudinally extending connection beads 41 which are of headed form. The open side of the channel 16 of the members 13 may be closed by a substantially planar member 39 as shown in Figure 13 which includes clip configurations 42 at each end which permit a snap connection with the beads 41 to close the open cavity of the member 14 and present a planar end face for presenting an aesthetic appearance or to provide a planar mounting surface for example for a shower screen

[0034] Figure 14 illustrates an alternative cavity closure member 43 which in this case is provided with a pair of parallel outwardly directed flanges 44 which extend at right angles to the planar face 45 for connection to a proprietary shower screen assembly. The closure member 43 may be snap engaged with the member 13 in the same manner as described with reference to Figure 13.

[0035] Figure 15 illustrates a 135° corner post 46 which includes a pair of flanges 47 extending at 135° to each other and clip configurations 48 at each end one of which is shown engaged with one of the beads 15 of the member 13 again through a snap connection. An intermediate flange 49 extends from the junction of the flanges 47 to terminate in opposite clip configurations 50 one of which engages with the other bead 15 of the member 13. The free ends of the corner post 46 may be closed by a planar cavity closer 51 (see Figure 16) or connected to a further end member 13 thus allowing respective glass brick walls 11 to be erected at 135° to

each other. It will be appreciated that the flanges 47 may be at any angle to each other depending upon the form of corner post required.

[0036] In the embodiment of Figure 16, the corner post 52 is a 90° corner post to allow a right angled termination by the cavity closer 51 or a right angled connection to a further end member 13. The corner post 52 is of similar configuration to the post 46 has in this embodiment side flanges 47' at right angles to each other and is as above snap connected to end members 13 or cavity closer 51.

[0037] In the embodiment of Fig 17, there is illustrated a nailing fin section 53 which is snap connected to the end member 13 and which may be secured by nailing to a stud 54 through a planar fin 55. The fin 55 is beaded at 56 at its inner end for snap connection with the groove 20 whilst a right angled flange 57 extending from the fin 55 terminates in a hooked member 58 which snap engages with a bead 15. On the opposite side of the member 13 a further cavity closer 59 which is snap engaged with the other bead 15 and includes a flange 60 which extends at an acute angle to the side flange 14 of the member 13 to abut with brickwork 61.

[0038] This arrangement adapts the a glass brick wall formed as above for use as a window in a brick veneer building construction.

[0039] The respective add on sections described above therefore adapt a glass brick wall for use as a shower screen, for connection to a shower screen, as a domestic or other fixed window, to join to other glass brick walls or with a termination to suit domestic or other requirements

[0040] Whilst the above has been given by way of illustrative example of the present invention many variations and modifications thereto will be apparent to those skilled in the art without departing from the broad ambit and scope of the invention as set out in the appended claims.

## Claims

1. A method of forming a glass brick assembly from a plurality of glass bricks, said method including the steps of providing upstanding end frame members for defining the boundaries of said assembly, providing separation strips for location between adjacent courses of bricks, providing connectors at each end of said separation strips for connecting said separation strips to said end frame members, and the end frame members having locators locating each said connector with its adjacent end frame member.
2. The method according to Claim 1 wherein the connectors are fitted to the locators using at least in part a rotating action to engage the locator.
3. The method according to Claim 1 wherein the con-

nectors are moved along the end frame members to effect final positioning.

4. The method according to Claim 1 wherein the connectors are brackets and the method includes manually moving a said bracket to a position frictionally held by the locators without the need for fasteners. 5
5. The method according to Claim 1 wherein at least one said end frame member is assembled from three rails. 10
6. The method according to Claim 1 wherein at least one end frame member comprises a rail having a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators with which the connectors may cooperate, the connectors being brackets having opposite tongues able to locate within the C-shaped channels behind the opposite flanges with the remainder of the bracket on the outside of the flanges, for erection of the glass brick assembly with separation strips between the respective courses of bricks, opposite brackets are assembled with a separation strip which is provided or cut to a length to extend between said opposite end frame members, the separation strip and brackets at each end is then oriented as a whole to allow the respective pairs of tongues of the respective brackets to enter each channel after which the separation strip and brackets are rotated to locate the tongues rearwardly of the channel flanges whereby the brackets are in frictional engagement therewithin, the end brackets are then be moved downwardly to position the separation strip in a desired operative position to receive a course of glass bricks. 15 20 25 30 35
7. The method according to Claim 1 wherein at least one frame member comprises a rail having a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators with which the connectors may cooperate, the connectors being brackets having opposite tongues able to locate within the C-shaped channels behind the opposite flanges with the remainder of the bracket on the outside of the flanges, for erection of the glass brick assembly with separation strips between the respective courses of bricks, opposite brackets are assembled with a separation strip which is provided or cut to a length to extend between said opposite end frame members, the separation strip and brackets at each end is then oriented as a whole so that the brackets may be moved into engagement endwise with the C-shaped channels with the tongues of the brackets located rearwardly of the opposite flanges of the 40 45 50 55

channels, the brackets being moved longitudinally along the channels to a desired operative position to receive a course of glass bricks.

8. A glass brick assembly formed from a plurality of glass bricks arranged in respective horizontal courses, end frame members comprising co-operating vertical rails for defining the boundaries of said assembly, the end frame members having connector locators, horizontal separation strips located between adjacent courses of bricks, connectors at each end of said separation strips held by said locators and connecting said separation strips to said end frame members.
9. A glass brick assembly according to claim 8 wherein the end frame members include a rail having a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators.
10. A glass brick assembly according to claim 8 wherein the end frame members include a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators, each connector includes opposite tongues which locate within the C-shaped channels behind the opposite flanges with the remainder of the brackets on the outside of the flanges.
11. A glass brick assembly according to claim 8 wherein the end frame member of one of said walls include a rail having a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators and also having an open channel section opposite the C-shaped channel, a second rail comprising a substantially planar cover plate connected to the open channel section and defining a terminal edge of said of said walls.
12. A glass brick assembly according to claim 8 wherein the end frame member of one of said walls include a rail having a planar transverse face and a pair of opposite flanges spaced from the planar face and defining therewith a C-shaped channel defining the connector locators and also having an open channel section opposite the C-shaped channel, a second rail comprising a cover plate with a pair of parallel outwardly extending flanges spaced to mate with a third rail engaging said parallel outwardly extending flanges.

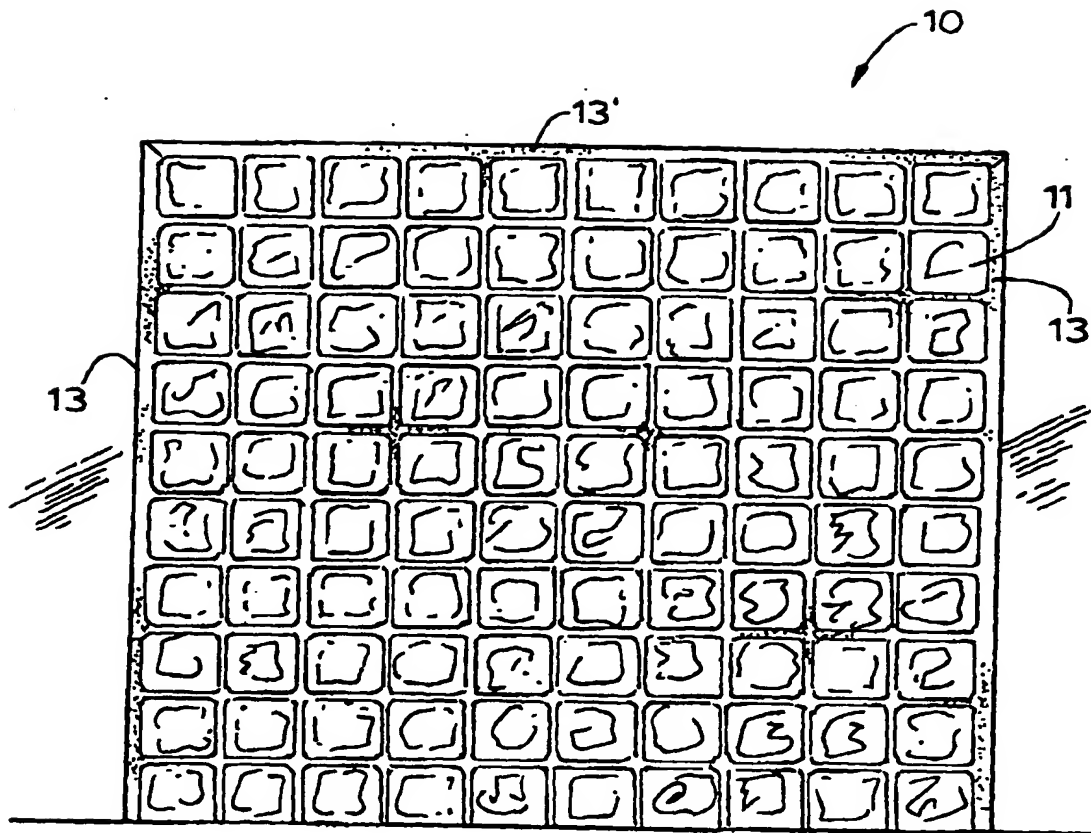
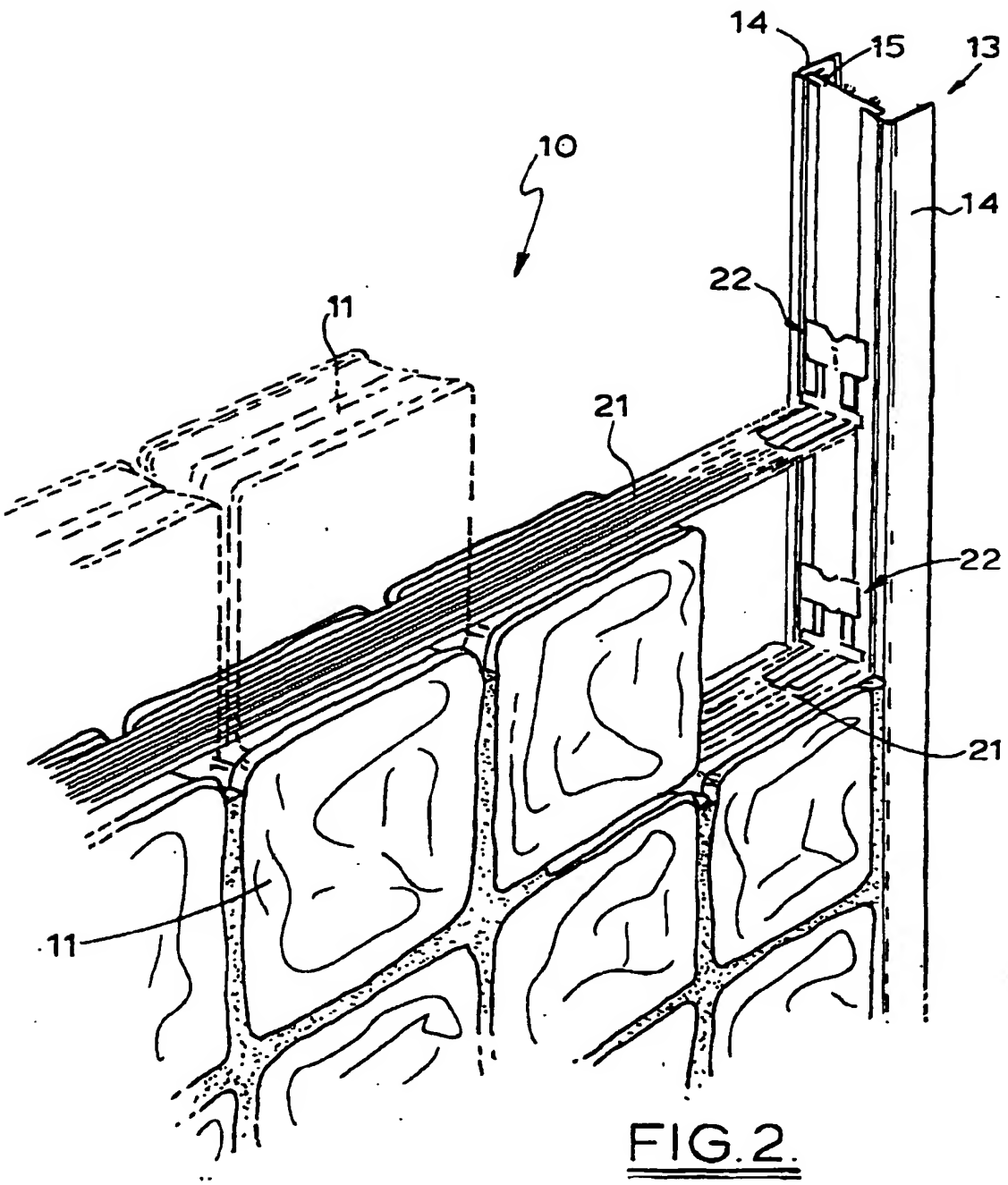


FIG. 1.





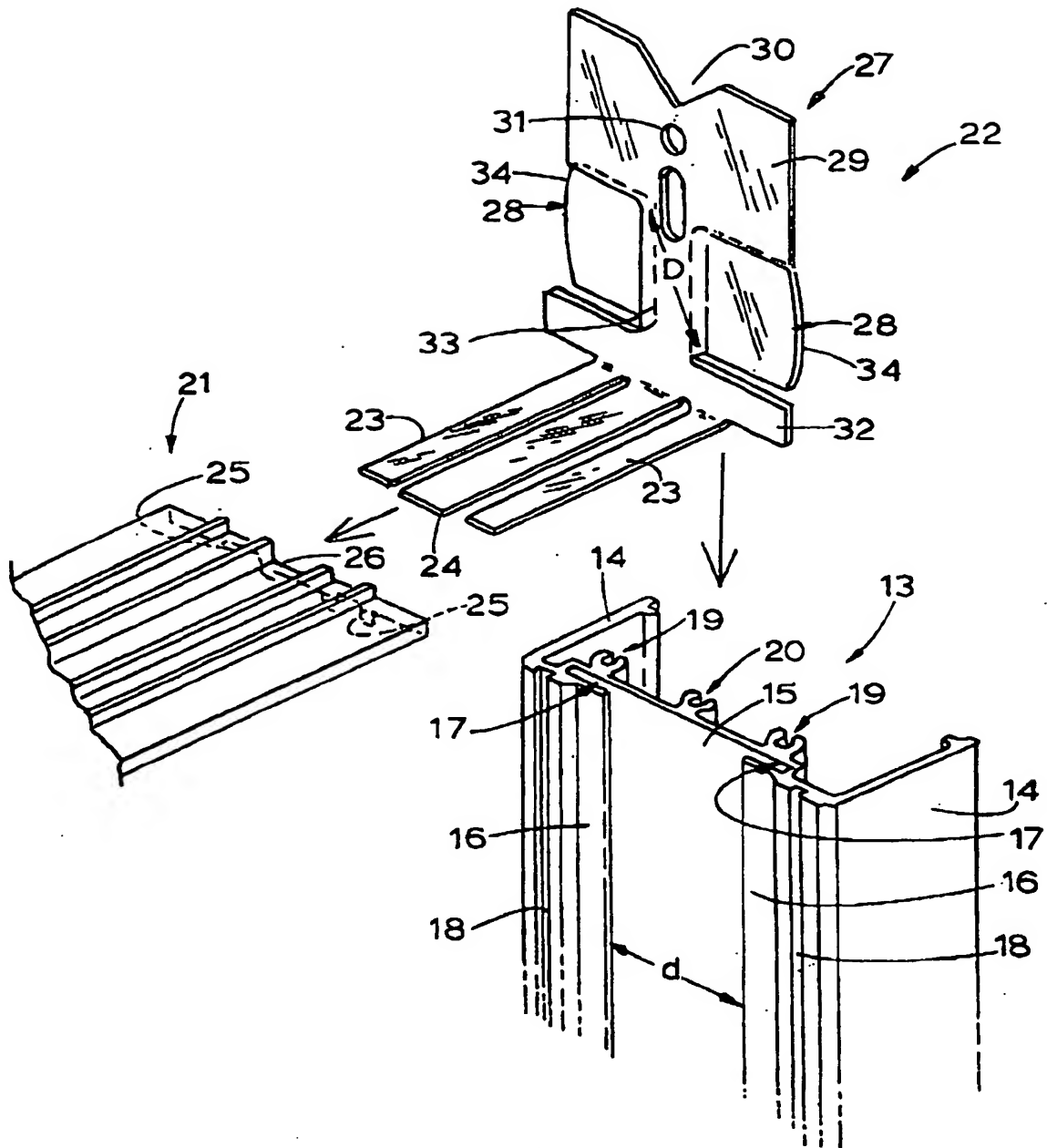


FIG. 3.

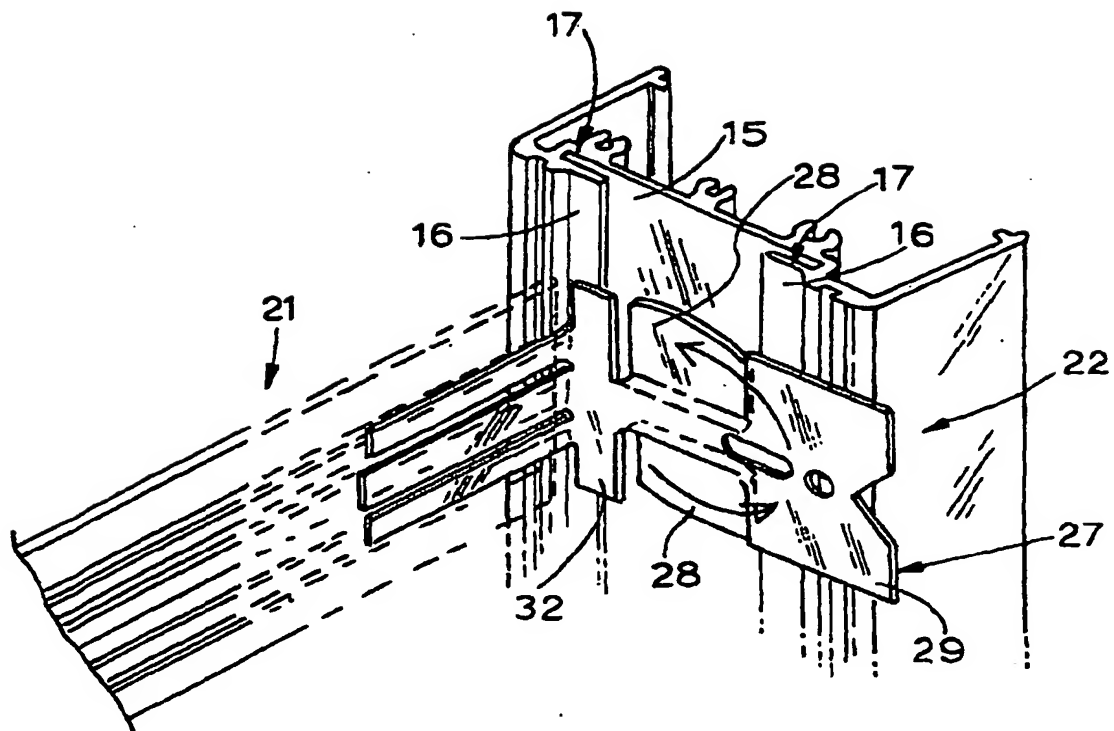


FIG. 4.

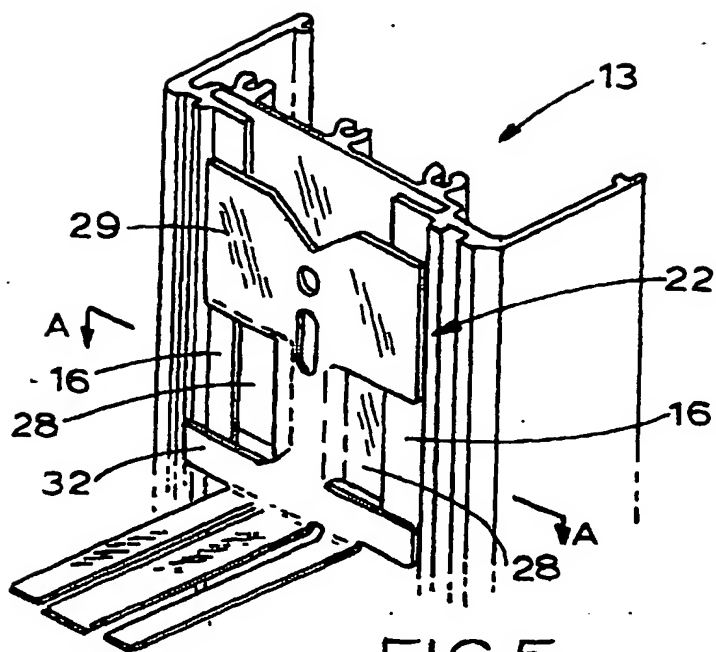


FIG. 5.

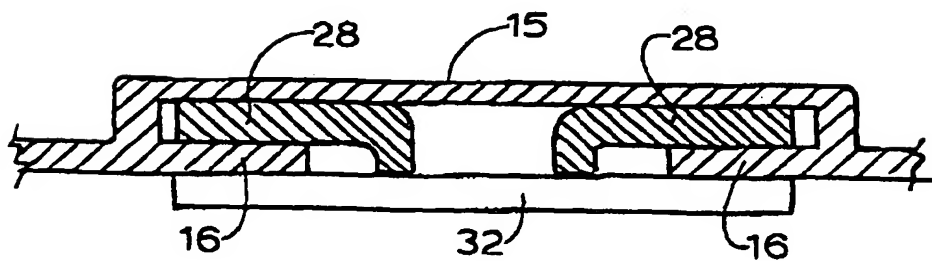


FIG. 6.

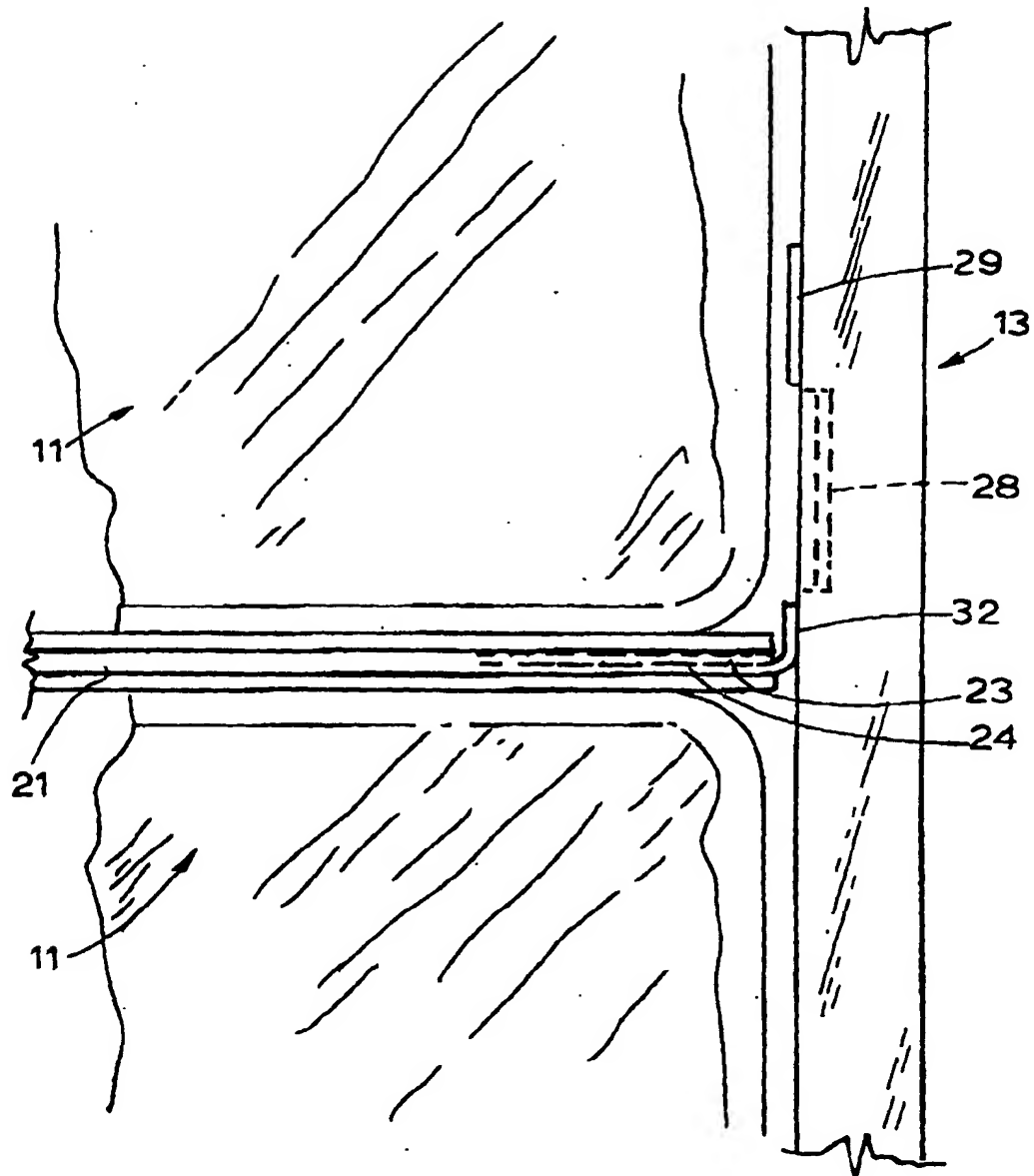
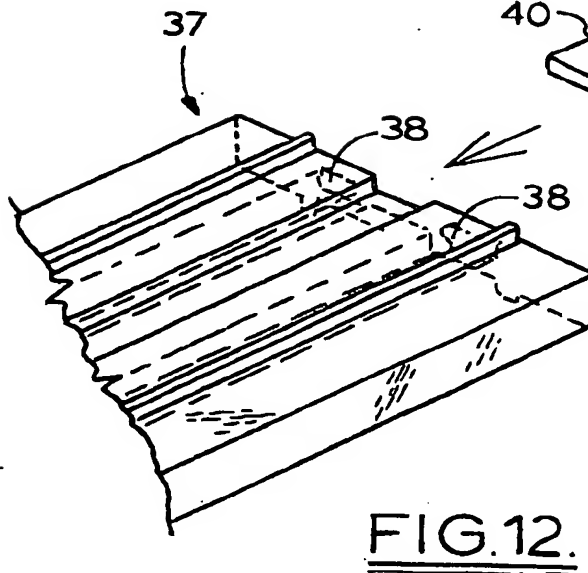
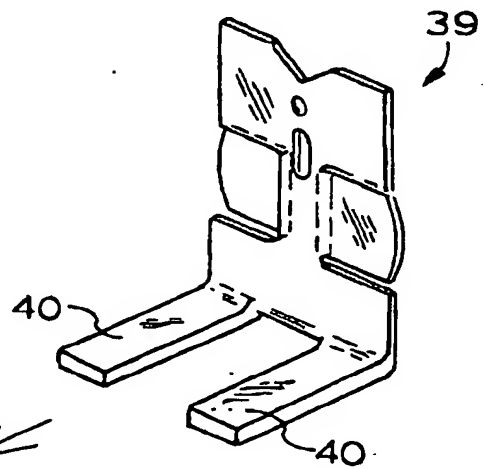
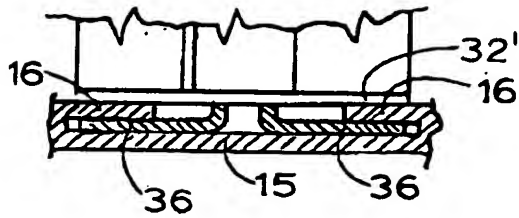
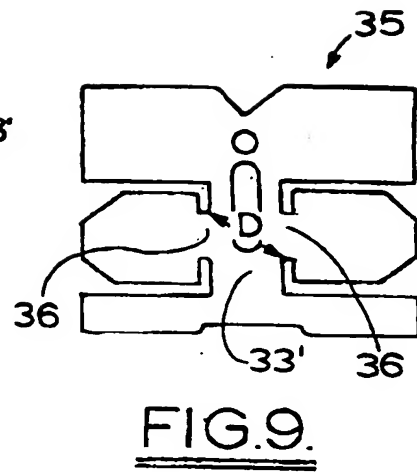
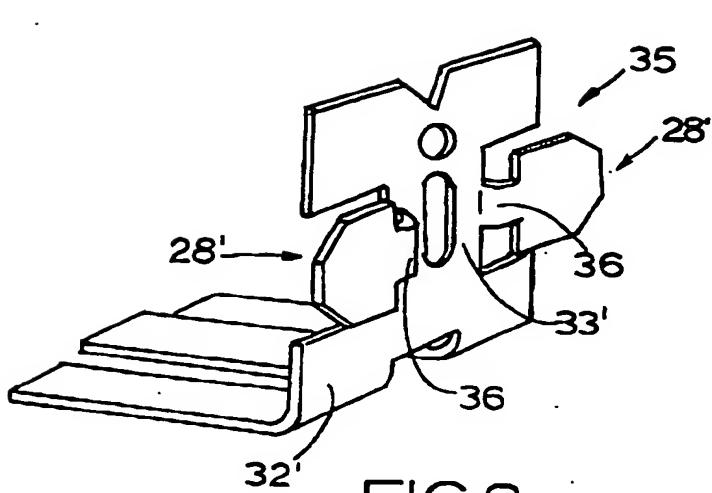


FIG.7.



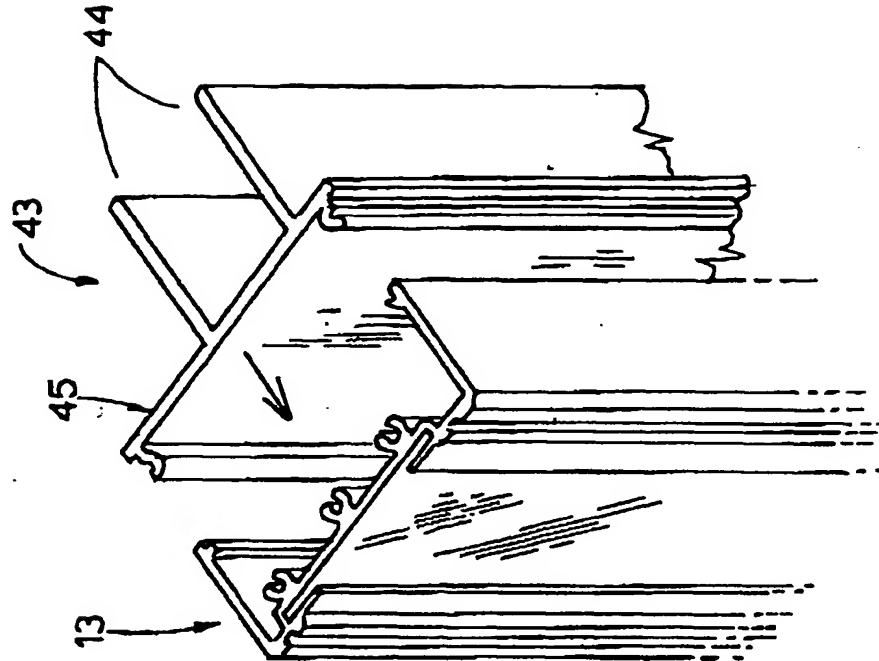


FIG. 14.

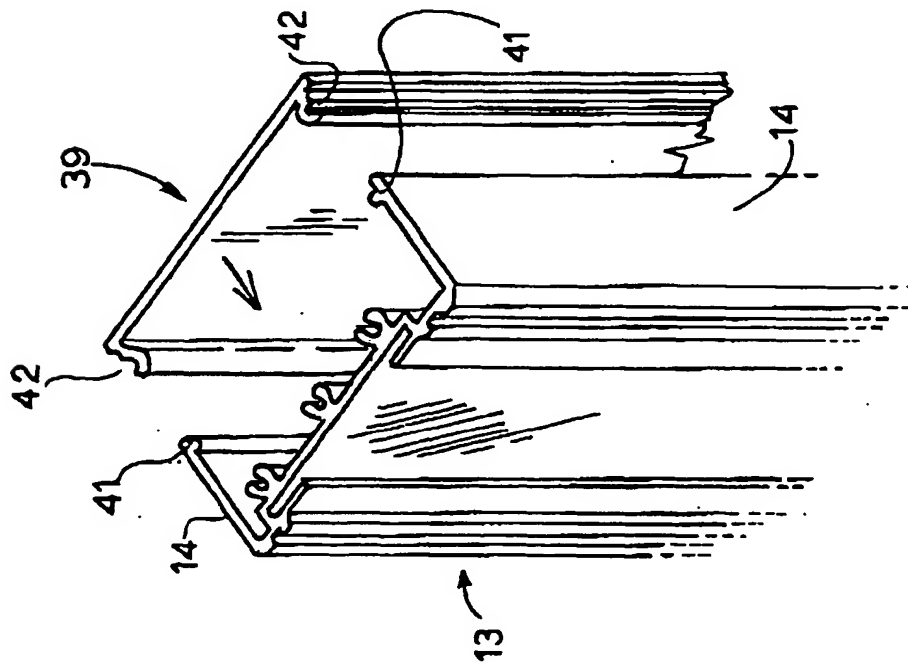


FIG. 13.

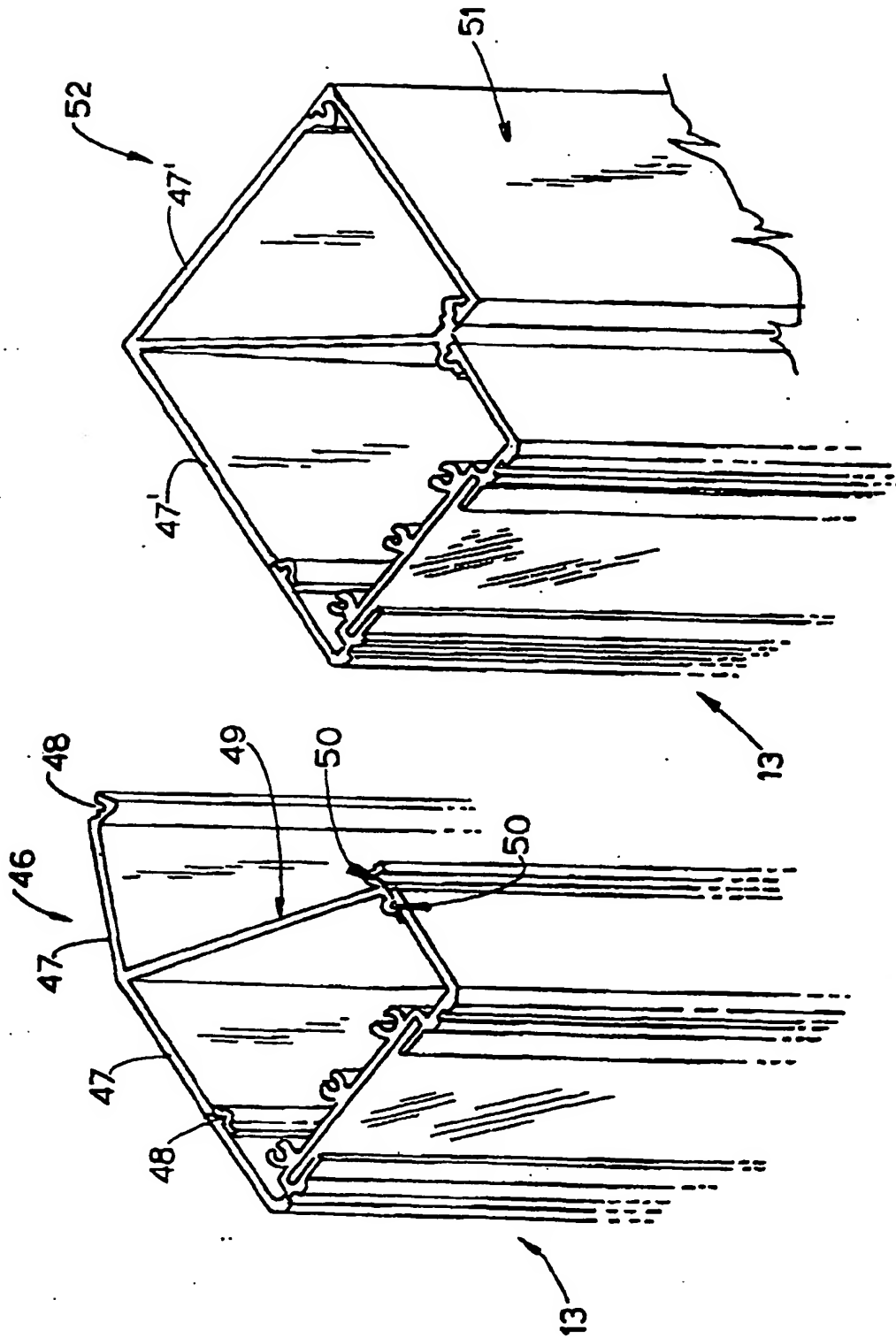
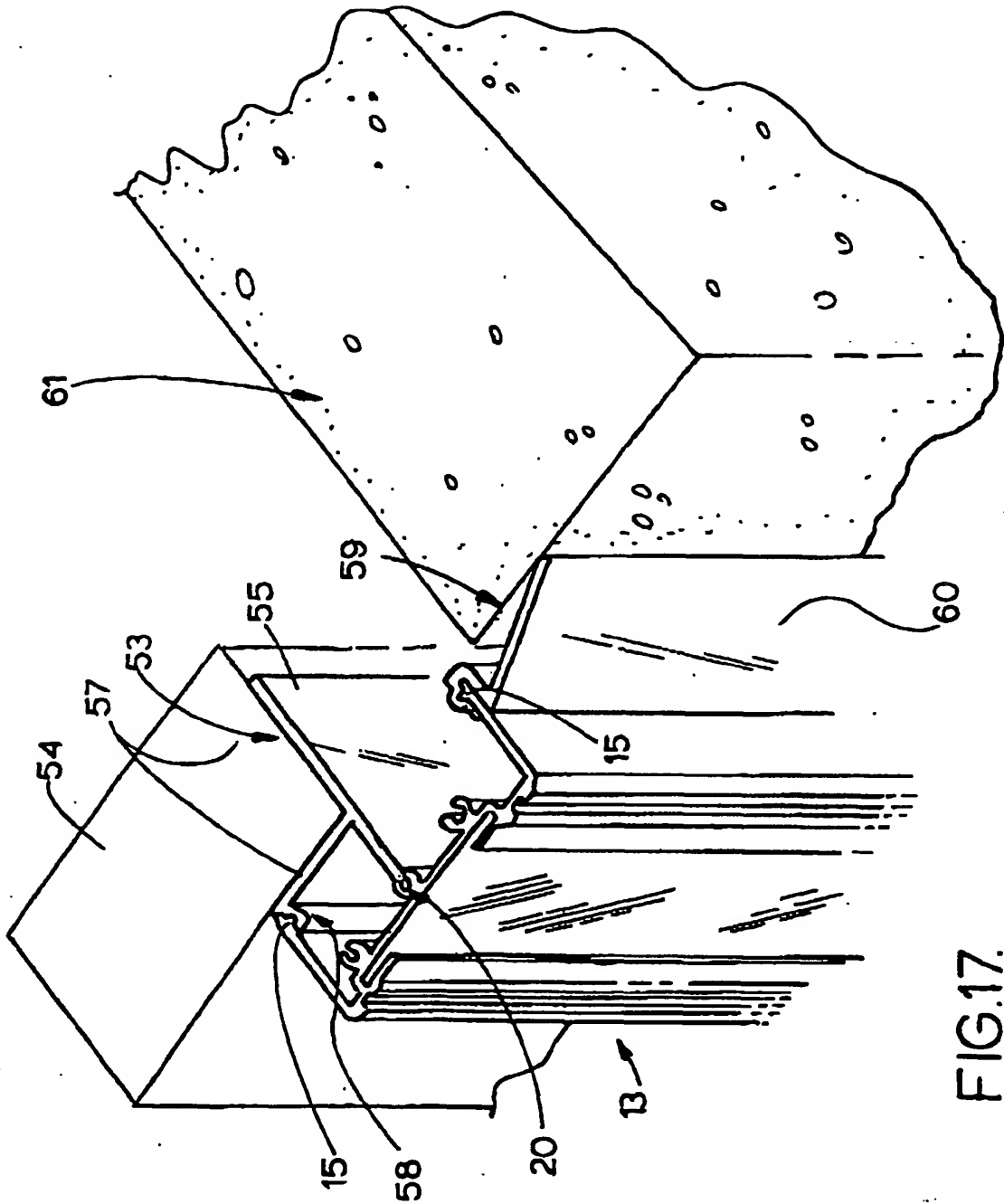


FIG. 15.

FIG. 16.





(19)



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(72) Inventor: **Wirkus, Randolph Andrew**  
Brookfield, Queensland, 4069 (AU)

(74) Representative: **Jones, Graham Henry**  
**Graham Jones & Company**  
77 Beaconsfield Road  
Blackheath, London SE3 7LG (GB)

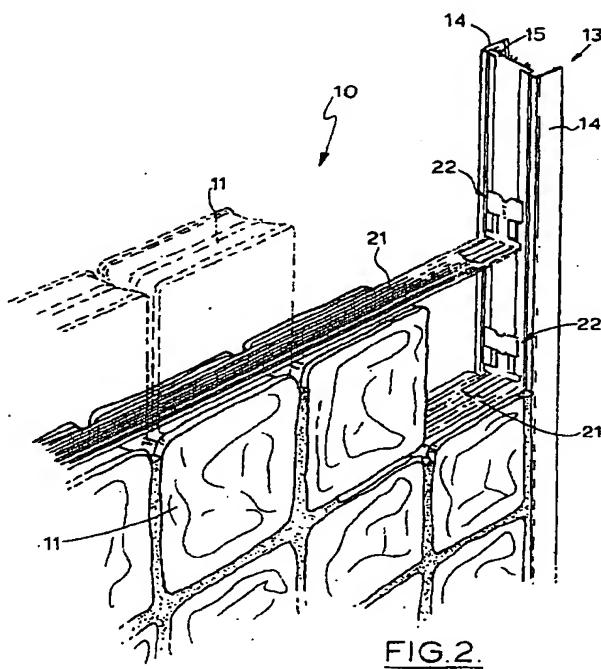
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(71) Applicant: **Euro-Glashaus, S.L**  
08810 Sant Pere de Ribes, Barcelona (ES)

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**FIG. 2.**



European Patent  
Office

# EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Place of search <b>THE HAGUE</b>		Date of completion of the search <b>5 December 2002</b>	Examiner <b>Mysliwetz, W</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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